

Transfusion associated circulatory overload risks and mitigation strategies

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OFFICIAL

Transfusion-associated circulatory overload (TACO) is a common transfusion reaction where excess fluid causes pulmonary oedema, leading to acute respiratory distress during or up to 12 hours post-transfusion.¹ TACO is identified as the leading cause of transfusion associated mortality and morbidity internationally.^{2,3,4,5}

What the data tells us

The National Blood Authority 2021-22 Haemovigilance report⁶ cited TACO as Australia's third most common transfusion reaction. Table 1 presents a comparison of TACO events reported to STIR with data from three international haemovigilance systems.

Table 1: TACO events reported to 4 haemovigilance systems over 4 years

Year	Australia – STIR (Vic, Tas, NT, ACT) Number (deaths)	UK – SHOT Number (deaths)	Canada – TTISS Number (deaths)	NZ Blood Service Number (deaths)
2020	19 (0)	149 (18)	280 (4)	18 (2)
2021	10 (0)	131 (11)	368 (10)	18 (0)
2022	28 (0)	160 (8)	316 (4)	32 (0)
2023	34 (0)	172 (15)	223 (0)	25 (0)

A case study

An elderly patient with symptomatic anaemia (Hb 66g/L) was transfused a bag of RBCs over one hour (volume 260 mL). Following transfusion, the patient developed chest pain/discomfort, dyspnoea, tachycardia and hypertension, and was treated with oxygen, diuretic, glyceryl trinitrate patch and hydrocortisone.

The patient had a history of chronic kidney disease and cardiomegaly. Post-transfusion chest X-ray was consistent with pulmonary oedema.

Retrospective review noted the patient had respiratory difficulties earlier in the day, attributed to anaemia. A previous chest X-ray indicated some congestion, suggestive of overload.

Know who is at risk and use risk reduction strategies

Patients with a lower body weight, patients over 60 years of age, infants and severely anaemic patients, are most at risk of developing TACO, however, it can occur in all age groups. Diagnoses typically include signs of positive fluid balance or cardiac conditions (Lifeblood, [Transfusion-associated circulatory overload \(TACO\)](#).| [Lifeblood](#)).

Staff caring for transfused patients should receive education on strategies to reduce the risk of TACO, including characteristics of patients at risk, preventative measures and monitoring during and post transfusion.

Patients at greatest risk of TACO	General strategies to reduce TACO risk
<ul style="list-style-type: none"> Heart failure: congestive cardiac failure, severe aortic stenosis, moderate or severe ventricular dysfunction Regular diuretic requirement Pre-existing respiratory symptoms, where cause is undiagnosed Pre-transfusion signs of pulmonary or peripheral oedema Positive fluid balance before transfusion Ongoing IV fluid administration Hypoalbuminaemia Significant renal impairment Severe chronic anaemia 	<ul style="list-style-type: none"> Do a pre-transfusion risk assessment Review the need for transfusion. Do the benefits outweigh the risks? Single unit transfusion with review between units if further units are deemed necessary Measure and monitor fluid balance, vital signs and symptoms of overload during and post transfusion Consider prophylactic diuretics where appropriate and not contraindicated Slow transfusion rate (maximum duration 4-hours) Body weight dosing of red blood cells particularly for infants, children and those with low body weight

Resources to assist practice

STIR and SHOT have resources to assist assessment and monitoring of patients at-risk of TACO:

- STIR educational materials related to TACO awareness, [Serious Transfusion Incident Reporting system \(STIR\) | health.vic.gov.au](https://www.health.vic.gov.au/serious-transfusion-incident-reporting-system-stir)
- SHOT UK, TACO pre-administration risk assessment tool [TACO pre-administration risk assessment - Serious Hazards of Transfusion](https://www.shotuk.org.uk/taco-pre-administration-risk-assessment-serious-hazards-of-transfusion)

References:

- Lifeblood, [Transfusion-associated circulatory overload \(TACO\) | Lifeblood](https://www.lifeblood.co.uk/transfusion-associated-circulatory-overload-taco)
- FDA, Fatalities Reported to FDA Following Blood Collection and Transfusion Annual Summary for Fiscal Year 2020 <https://www.fda.gov/media/160859/download>
- New Zealand Blood Service, National Haemovigilance Programme Annual Reports 2020 - 2023, <https://www.nzblood.co.nz/healthcare-professionals/haemovigilance-programme/haemovigilance-annual-report/>
- Serious Hazards of Transfusion (SHOT) Annual Reports 2020 – 2023 [Annual SHOT Reports - Serious Hazards of Transfusion](https://www.shotuk.org.uk/annual-reports)
- Transfusion Transmitted Injuries Surveillance System (TTISS) 2016-2020 Summary Report [transfusion-transmitted-injuries-surveillance-system-summary-report-2016-2020.pdf](https://www.transfusion-transmitted-injuries-surveillance-system-summary-report-2016-2020.pdf)
- Australian Haemovigilance Report, Data for 2021-22 published by the National Blood Authority <https://www.blood.gov.au/haemovigilance-reporting>

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